



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,069	06/24/2003	Stanislav Smirnov	1857.1870000	1221
26111	7590	09/10/2004	EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX PLLC 1100 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			MATHEWS, ALAN A	
			ART UNIT	PAPER NUMBER
			2851	

DATE MAILED: 09/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/602,069

Applicant(s)

SMIRNOV ET AL.

Examiner

Alan A. Mathews

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 12 is/are rejected.
- 7) ☒ Claim(s) 11 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: In the specification, page 3, line 3 of paragraph # 9, numeral "102" is used to designate the SLM. But on lines 4, 7, 8, 9, 10, 13, 14, and 15 of paragraph #9, numeral "104" has been used to designate the SLM in paragraph # 9. Furthermore, line 2 of paragraph #9 has designated the illumination system as element "104". The drawings designate numeral "102" as the SLM and numeral "104" as the illumination system.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 6, 7, and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Bjorklund et al. (U. S. Patent No. 6,707,534). Figure 3 and column 7, lines 3-32, discloses element 3 as a

Art Unit: 2851

means for illuminating that generates light. The means for directing light includes element 4. The means for patterning light after it is received from the means for directing includes spatial light modulator array 2C. Spatial light modulator array 2C has a non-linear patterning surface (see column 7, lines 28-32, and figure 3). With respect to claim 7, column 7, line 31 recites “curvature”. With respect to claim 12, non-linear shaped gambles 22 are the support surface. The active areas are coupled to the gambles to conform to a shape of the non-linear support surface.

4. Claims 1, 2, 5-7, and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Sandstrum et al. (U. S. Patent No. 6,624,880). Sandstrum et al. discloses in figure 2A and column 2, lines 32-63, and column 8, lines 27-60) an illumination system 10 and 20. Element 30 is an SLM. The exposure system includes elements 40 and 50. A beam splitter 25 directs light from the illumination system (10 and 20) to the SLM (30) and from the SLM to the exposure system (40 and 50). Sandstrum et al. further discloses in column 6, lines 25 and 26 that “**the SLM 30 need not even be curved**”, which indirectly implies that SLM could be curved. With respect to claim 5, figure 2B discloses an optical element 35 between the beam splitter 25 and the SLM 30.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

Art Unit: 2851

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 2, 5-7, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrum et al. (U. S. Patent No. 6,624,880) in view of Bjorklund et al. (U. S. Patent No. 6,707,534). Sandstrum et al. discloses in figure 2A and column 2, lines 32-63, and column 8, lines 27-60) an illumination system 10 and 20. Element 30 is an SLM. The exposure system includes elements 40 and 50. A beam splitter 25 directs light from the illumination system (10 and 20) to the SLM (30) and from the SLM to the exposure system (40 and 50). Sandstrum et al. further discloses in column 6, lines 25 and 26 that **“the SLM 30 need not even be curved”**, which indirectly implies that SLM could be curved. But Sandstrum et al. does not go into further details as to what is meant by the above quote. Thus, Sandstrum et al. discloses the invention claimed except for explicitly disclosing (arguendo) that the SLM has a non-linear shape. Bjorklund et al. discloses in figure 3 and column 7, lines 3-32, a spatial light modulator array 2C. Spatial light modulator array 2C has a non-linear patterning surface (see column 7, lines 28-32, and figure 3). With respect to claim 7, column 7, line 31 recites “curvature”. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide Sandstrum et al. with a non-linear shaped SLM in view of Bjorklund et al. for the purpose of matching a more complex substrate surface configuration and thus producing a more accurate final product.

Art Unit: 2851

7. Claims 3, 4, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bjorklund et al. (U. S. Patent No. 6,707,534) as applied to claim 1 above, and further in view of Klosner et al. (U. S. Patent No. 6,416,908). Bjorklund discloses in figure 3 and column 7, lines 3-32, discloses element 3 as a means for illuminating that generates light. The means for directing light includes element 4. The means for patterning light after it is received from the means for directing includes spatial light modulator array 2C. Spatial light modulator array 2C has a non-linear patterning surface (see column 7, lines 28-32, and figure 3). With respect to claim 7, column 7, line 31 recites "curvature". Thus, Bjorklund discloses the invention except for specifically disclosing the shape of the SLM being either concave or spherical. Klosner et al. discloses in figures 1 and 2 a concave mask 12 used to expose a substrate (see column 7, lines 3-26). Column 8, lines 50-52, further disclose using spherical shaped masks. With respect to claim 12, Klosner also discloses a non-linear support surface for the mask. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide Bjorklund et al. with a concave or spherical SLM in view of Klosner et al. for the purpose of more accurately exposing curved substrates and thus producing a better final product.

8. Claims 3, 4, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandstrum et al. as applied to claims 1 and 6 above, and further in view of Klosner et al. (U. S. Patent No. 6,416,908). Klosner et al. discloses the invention except for explicitly disclosing a concave SLM or a spherical SLM. Klosner et al. discloses in figures 1 and 2 a concave mask 12 used to expose a substrate (see column 7, lines 3-26). Column 8, lines 50-52, further disclose

Art Unit: 2851

using spherical shaped masks. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide Sandstrum et al with a concave or spherical SLM in view of Klosner et al. for the purpose of more accurately exposing curved substrates and thus producing a better final product.

Allowable Subject Matter

9. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The patent to Johnson is cited to show digital micromirror devices used with beam splitters to expose wafers. The patents to Eglio et al. and Ishikawa are cited to show maskless lithography. The patent to Cooper et al. is cited to show a programmable mask. The patent to Blecker et al. is cited to show SLM's.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan A. Mathews whose telephone number is (571) 272-2123. The examiner can normally be reached on Monday through Friday from 8:00 AM to 4:30 PM.

Art Unit: 2851

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571) 272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Alan A. Mathews
Primary Examiner
Art Unit 2851

AM